

Claims

- [c1] 1. A device for encoding a bit stream of data bits of a binary source signal into a stream of data bits of a binary channel signal, m -bit source words are converted to n -bit codeword, the device comprising:
converting means used to convert source words having a variable word length with a basic word length of m bits and a total word length of $m \cdot i$ bits into $n \cdot i$ -bit codewords, i being an integer of at least 1;
wherein the converting means limits a characteristic of the codeword specified for each starting bit position in the code word.
- [c2] 2. The device of claim 1, wherein the converting means preserves the parity of the m -bit source words over the codeword.
- [c3] 3. The device of claim 1, wherein the converting means limits a maximum number of repeating bit patterns specified for each starting bit position in the codeword.
- [c4] 4. The device of claim 1, wherein the converting means limits a maximum number of the consecutive appearances of the minimum run of zeros d for each starting

bit position in the codeword.

- [c5] 5.The device of claim 1, wherein the converting means limits a maximum run of zeros k for each starting bit position in the codeword.
- [c6] 6.The device of claim 1, wherein the codeword are a variable length code $(d, k_{VAR}; m, n; r; RMTR_{VAR})$, wherein r is a maximum value of i and is at least 2, d is a minimum run of zeros, k_{VAR} is a maximum run of zeros specified for each starting bit position in the codeword, and $RMTR_{VAR}$ is a maximum number of consecutive appearances of the minimum run of zeros d specified for each starting bit position in the codeword.
- [c7] 7.The device of claim 6, wherein the variable length code comprises:
 $d = 1$;
 $RMTR_{VAR} = (3, 4, 3)$;
 $k_{VAR} = (6, 7, 7)$;
 $m = 2$;
 $n = 3$; and
 $r = 5$.
- [c8] 8.The device of claim 6, wherein the variable length code comprises:
 $d = 1$;

$RMTR_{VAR} = (4,5,4);$

$k_{VAR}^r = (6,7,6);$

$m = 2;$

$n = 3;$ and

$r = 5.$

- [c9] 9.The device of claim 1, wherein the converting means determines the codeword by referring to an immediately succeeding string of m-bit source words.
- [c10] 10.The device of claim 1, wherein the converting means determines the codeword by referring to an immediately preceding code word.
- [c11] 11. A device for decoding a bit stream of data bits of a binary channel signal into a stream of data bits of a binary source signal, n bits channel codeword are converted to m-bit source words, the device comprising: converting means used to convert codeword having a variable code length with a basic code length of n bits and a total code length of $n*i$ bits into $m*i$ -bit source words, i being an integer of at least 1; wherein the bit stream of channel code words have a characteristic specified for each starting bit position in the code word.
- [c12] 12.The device of claim 11, wherein the converting means

preserves the parity of the codeword over the m-bit source words.

- [c13] 13.The device of claim 11, wherein the codeword are limited with a maximum number of repeating bit patterns specified for each starting bit position.
- [c14] 14.The device of claim 11, wherein codeword are limited with a maximum number of the consecutive appearances of the minimum run of zeros d for each starting bit position in the codeword.
- [c15] 15.The device of claim 11, wherein codeword are limited with a maximum run of zeros k for each starting bit position in the codeword.
- [c16] 16.The device of claim 11, wherein the codeword are a variable length code $(d, k_{VAR}; m, n; r; RMTR_{VAR})$, wherein r is a maximum value of i and is at least 2, d is a minimum run of zeros, k_{VAR} is a maximum run of zeros specified for each starting bit position in the codeword, and $RMTR_{VAR}$ is a maximum number of consecutive appearances of the minimum run of zeros d specified for each starting bit position in the codeword.
- [c17] 17.The device of claim 16, wherein the variable length code comprises:
 $d = 1$;

$RMTR_{VAR} = (3,4,3);$

$k_{VAR} = (6,7,7);$

$m = 2;$

$n = 3;$ and

$r = 5.$

[c18] 18. The device of claim 16, wherein the variable length code comprises:

$d = 1;$

$RMTR = (4,5,4);$

$kvar = (6,7,6);$

$m = 2;$

$n = 3;$ and

$r = 5.$

[c19] 19. The device of claim 11, wherein the converting means determines the m-bit source words by referring to an immediately succeeding string of codeword.

[c20] 20. A method for encoding a bit stream of data bits of a binary source signal into a stream of data bits of a binary channel signal, m-bit source words are converted to n-bit codeword, the method comprising:
converting source words having a variable word length with a basic word length of m bits and a total word length of $m*i$ bits into $n*i$ -bit codewords, i being an integer of at least 1; and

limiting a characteristic of the codeword specified for each starting bit position in the code word.

[c21] 21.The method of claim 20,further comprising preserving the parity of the m-bit source words over the codeword.

[c22] 22.The method of claim 20,wherein limiting a characteristic of the codeword further comprises limiting a maximum number of repeating bit patterns specified for each starting bit position in the codeword.

[c23] 23.The method of claim 20, wherein limiting a characteristic of the codeword further comprises limiting a maximum number of the consecutive appearances of the minimum run of zeros d for each starting bit position in the codeword.

[c24] 24.The method of claim 20, wherein limiting a characteristic of the codeword further comprises limiting a maximum run of zeros k for each starting bit position in the codeword.

[c25] 25.The method of claim 20, wherein the codeword are a variable length code ($d, k_{VAR}; m, n; r; RMTR_{VAR}$), wherein r is a maximum value of i and is at least 2, d is a minimum run of zeros, k_{VAR} is a maximum run of zeros specified for each starting bit position in the codeword,

and $RMTR_{VAR}$ is a maximum number of consecutive appearances of the minimum run of zeros d specified for each starting bit position in the codeword.

[c26] 26.The method of claim 25, wherein the variable length code comprises:

$d = 1;$

$RMTR_{VAR} = (3,4,3);$

$k_{VAR} = (6,7,7);$

$m = 2;$

$n = 3;$ and

$r = 5.$

[c27] 27.The method of claim 25, wherein the variable length code comprises:

$d = 1;$

$RMTR_{VAR} = (4,5,4);$

$k_{VAR}^r = (6,7,6);$

$m = 2;$

$n = 3;$ and

$r = 5.$

[c28] 28.The method of claim 20, further comprising determining the codeword by referring to an immediately succeeding string of m -bit source words.

[c29] 29.The method of claim 20, further comprising deter-

mining the codeword by referring to an immediately preceding code word.

[c30] 30. A method for decoding a bit stream of data bits of a binary channel signal into a stream of data bits of a binary source signal, n bits channel codeword being converted to m -bit source words, and the method comprising:

converting codeword having a variable code length with a basic code length of n bits and a total code length of $n \cdot i$ bits into $m \cdot i$ -bit source words, i being an integer of at least 1; and

specifying a characteristic for each starting bit position in the channel code words.

[c31] 31. The method of claim 30, further comprising preserving the parity of the codeword over the m -bit source words.

[c32] 32. The method of claim 30, wherein the codeword are limited with a maximum number of repeating bit patterns specified for each starting bit position in the codeword.

[c33] 33. The method of claim 30, wherein the codeword are limited with a maximum number of consecutive appearances of a minimum run of zeros d specified for each

starting bit position in the codeword.

[c34] 34.The method of claim 30, wherein the codeword are limited with a maximum run of zeros k specified for each starting bit position in the codeword.

[c35] 35.The method of claim 30, wherein the codeword are a variable length code $(d, k_{VAR}; m, n; r; RMTR_{VAR})$, wherein r is a maximum value of i and is at least 2, d is a minimum run of zeros, k_{VAR} is a maximum run of zeros specified for each starting bit position in the codeword, and $RMTR_{VAR}$ is a maximum number of consecutive appearances of the minimum run of zeros d specified for each starting bit position in the codeword.

[c36] 36.The method of claim 35, wherein the variable length code comprises:

$d = 1;$

$RMTR_{VAR} = (3,4,3);$

$k_{VAR} = (6,7,7);$

$m = 2;$

$n = 3;$ and

$r = 5.$

[c37] 37.The method of claim 35, wherein the variable length code comprises:

$d = 1;$

$RMTR = (4,5,4);$

$kvar = (6,7,6);$

$m = 2;$

$n = 3;$ and

$r = 5.$

[c38] 38. The method of claim 30, further comprising determining the m -bit source words by referring to an immediately succeeding string of codeword.